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EARLY WARNING SYSTEMS

Report of the ad hoc Panel

Note by the secretariat

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1. Introduction

1. By decision 14/COP.3, the Conference of the Parties of UNCCD appointed an ad hoc panel of 10 experts "to review and elaborate on the following technical topics emerging from national reports of Parties and regional forums on implementation of the Convention:

(a) Data collection, accessibility, and integration;

(b) Evaluation and prediction of drought and desertification, and measures for preparedness, in cooperation with the follow-up to the International Decade for Natural Disaster Reduction;

(c) Dissemination of information to end-users on the applications of early warning systems and desertification monitoring and assessment, and strengthening of appropriate response mechanisms, particularly in the national action programmes to combat desertification."

2. The ad hoc Panel convened in Bonn, Germany, from 31 May to 3 June 2000. The ad hoc Panel members who attended are listed in annex I. The Panel selected the following officers:

Chair:	Dr. Kazuhiko Takeuchi (Japan)
Vice-Chair:	Mr. Abdellah Ghebalou (Algeria)
Vice-Chair and Secretary:	Dr. Anneke Trux (Germany)
Vice-Secretaries:	Dr. Patricio Aceituno (Chile)
	Dr. Ali Umran Komuscu (Turkey)

3. In accordance with decision 14/COP.3, experts from relevant technical institutions with operational responsibilities in desertification and drought information systems also participated in the meeting (see annex I).

4. The participants reviewed the background documents, including reports provided by Panel members and experts (see annex II).

5. Based on those documents, the participants developed a common understanding of the terms of reference and engaged in a substantive discussion.

6. The discussions responded to article 16 of UNCCD, which states that "The Parties agree, according to their respective capabilities, to integrate and coordinate the collection, analysis and exchange of relevant short-term and long-term data and information to ensure systematic observation of land degradation in affected areas and to understand better and assess the processes and effects of drought and desertification. This would help accomplish, *inter alia*, early warning and advance planning for periods of adverse climatic variations in a form suited for practical applications by users at all levels, including local populations."

7. Recognizing the importance of building on existing operational early warning systems within the framework of National Action Programmes to Combat Desertification (NAP), the participants reviewed and elaborated the three technical topics defined in decision 14/COP.3 and agreed to the conclusions covered in the following sections.

2. Data collection, accessibility and integration

The participants recognize that data collection, access, and integration are the responsibilities of Governments at the national level. National Action Programmes should address these data responsibilities and define clear objectives for data collection, access and integration of programmes as well as the need for better data access.

Data collection

- It is far more important to maintain and strengthen existing observation networks than to expand or create new systems. Hydrological and meteorological networks in many desertification-affected countries, especially in the developing regions are falling into disrepair. *The Panel recommends that Parties provide adequate support to maintain existing observation networks.*

- Early warning systems should capitalize on the techniques and methods developed already by researchers and operational programmes and operationalize them as soon as possible.

- The participants underlined the need for data reliability. Metadata, which fully describes the details of data format, sources and calculation, should accompany every database. Organizations involved in data collection must pay attention to standardization and compatibility in data content and format and compatibility among scales of analyses, from local to subnational, national, subregional, regional, and global levels.

- Where appropriate, the local population should be actively involved in the data collection process and efforts must be made to ensure that useful information is conveyed back to them.

- Given the extend of the drought and desertification problem, data collection should span a range of spatial and temporal scales and should serve long-term planning.

- Some indicators are common to both drought early warning systems and desertification information systems.

Data access

The participants recognized the following constraints:

- Inadequate infrastructure

- High costs in cases when data are treated as commercial property

- Political restrictions, e.g. national security

- Lack of protocols for data exchange between institutions

In order to improve data accessibility, the Panel recommends the following:

- Easy and unlimited public access to databases is a prerequisite for effective early warning systems: However, the issue of data sovereignty must be taken into account in facilitating universal access to the different actors involved

- Define appropriate distribution and pricing policies in order to have the easiest and most cost-effective access to data and information for the different categories of users

- Take advantage of the recent development of technical tools especially in telecommunication in order to facilitate decentralized data management and access

Data integration

- The participants recognize the development in the use of such tools as geographical information systems (GIS) for faster and more efficient integration of data from different sources. Attention should be paid to developing capacities at national, subregional and regional levels to take advantage of such tools and techniques.

- The Panel invites the Parties to encourage donors who are in a position to provide assistance to support such capacity-building activities in developing countries.

- Early warning systems operate through a multidisciplinary approach. Therefore, partnerships between different disciplines that strengthen cooperation and transparency will advance the work of early warning systems.

3. Evaluation and prediction of drought and desertification, and measures for preparedness, in cooperation with the follow-up to the International Decade for Natural Disaster Reduction

For its deliberations, the participants recall the definitions in Article 1 of the Convention of "desertification," "drought," "combating desertification", and "mitigating the effects of drought".

The Panel and the experts also examined early warning systems in the light of the approach adopted by the International Strategy for Disaster Reduction (ISDR). This approach proceeds from hazard protection to risk management through four stages: public awareness, commitment from community leaders and public authorities, implementation of measures to enhance the resilience of communities to disaster, and the mitigation of social and economic losses.

General comments

- Early warning for drought prediction and assessment, and monitoring and assessment for desertification are fundamentally interrelated yet operationally different activities. Currently no operational early warning system exists for desertification.

- In the short-term, early warning systems for drought prediction and assessment provide information for contingency response planning. Desertification monitoring and assessment will provide information in the long-term to improve systems of community-based natural resource management and institutional capacities.

- Desertification monitoring systems should be built in connection with the operational drought early warning systems.

- Early warning systems for drought and desertification monitoring systems must examine the full range of biological, physical, climatic, social and economic factors involved in desertification.

- In the interest of sustainability, operating costs of early warning systems must be taken into account. The profitability of early warning systems is related to their utilization.

Assessment of drought

- Drought is a natural hazard originating from a deficiency of precipitation that results in a water shortage for some activities or some groups. Lack of precipitation occurring over an extended period of time, usually a season or more in length, is often associated with other climatic factors (such as

high temperatures, high winds and low relative humidity) and can aggravate the severity of the event. From a hydrological viewpoint, extended shortage of rainfall forces a corresponding flow variability in dryland rivers, and consequently in runoff and in soil moisture. The latter, of critical importance to crop productivity, is affected not only by the amount and seasonal incidence of rainfall, but also by the ability of soils to absorb and store water and by moisture losses through evapotranspiration.

- For effective assessment of drought, systematic observation, collection, analysis and exchange of meteorological, climatological and hydrological data and information are necessary. National Meteorological and Hydrological Services (NMHSs) are actively involved in these activities and in the development of relevant techniques for the assessment of drought. The Panel emphasized the importance of enhancing national climatological, meteorological and hydrological capabilities for timely assessment of drought and its dissemination of information as enshrined in article 10 of the UNCCD.

- It is important to remember that drought severity is dependent not only on the duration, intensity and geographical extent of precipitation deficiency, but also on the demands made by human activities and vegetation on region's water supplies. Drought assessment efforts must take into account the influence of these factors.

- Drought assessment can use climate, hydrological, physical, biological and socio-economic indicators. These indicators can be used alone or in combination and sometimes two or more indicators can be combined to form derived indices. Meteorologists and climatologists have made considerable progress in drought assessment and have developed a number of indices. There are a number of indices in use for drought assessment and these provide specific information on a range of issues related to drought assessment.

Prediction of drought

The socio-economic upheavals that have occurred, especially in Africa, over the past few decades due to drought, have underlined the urgent need to predict interannual climatic variations for drought, prediction still heavily relies on the monitoring of observed patterns of monthly and seasonal rainfall, streamflows, groundwater levels, snowpack and other parameters. Developing predictive skills for large geographical regions on monthly and seasonal timescales (e.g. physically and statistically based Global Circulation Models (GCMs)), offers promise for increasingly useful forecasts of the onset, severity and duration of drought.

Climate variability brings lower precipitation in some areas and higher precipitation in others. CLIVAR, a research programme on climate variability and prediction for the 21st century, in the framework of the World Climate Research Programme and the advances made in the use of the predictive properties of Sea Surface Temperature (SST) and ocean-atmosphere coupling processes have led to improvements in drought prediction. For example, a strong coherence of climate anomalies in the Asia and Pacific region is associated with El Niño - Southern Oscillation (ENSO) phenomenon; this is the basis for current prediction on seasonal time scales. Practicable, usable seasonal and inter-annual forecasts of precipitation in areas with a strong ENSO signal are becoming more reliable and can be made with longer lead times. Significant advances have been made in the past three years through the organization of climate outlook forums in different regions of the world under the auspices of the Climate Prediction and Information Services (CLIPS) of the World Meteorological Organization (WMO) in issuing climate forecasts. Drought related forecasts were issued during the

1997-1998 El Niño event and were stated in terms of probability of below average, average or above average precipitation. Some meteorological services have developed a drought watch service, utilizing real-time hydrological and meteorological data.

The Panel highlights that augmenting the growing capability to provide seasonal and inter-annual climate forecasts is essential to combat the effects of drought in diverse regions of the world. Data from meteorological satellites are being used for prediction of rainfall and remotely sensed data from geostationary satellites and polar orbiting satellite are being used as input data for seasonal rainfall prediction. Early warning systems currently provide maps of the location of socio-economic groups vulnerable to drought and organizations involved in drought mitigation urgently need this information for quick action.

Assessment of desertification

Assessment of desertification depends on the availability of physical, biological, social and economic information from different sources. The most useful parameters, among others, are climate, land-use and cover change, vegetative productivity, soil productivity, land management practices, demographic factors as well as institutional parameters.

The Overall Assessment of Desertification (OAD) proposed by the UNCCD secretariat will provide information on trends of degradation of natural resources, specifically water, vegetation and soils as well as the main socio-economic and driving factors on a global scale. National, subregional and regional desertification assessments should provide data on a smaller scale.

The Panel concludes that it is essential to concentrate assessment on the elements that can eventually be influenced.

Identification of populations at risk and conducting desertification assessment in the context of sustainable development is crucial to programmes that are beneficial to local communities.

Prediction of desertification

- Desertification is difficult to predict because of the complexity of the interaction of the multiple driving forces and its long-term nature. Therefore the Panel suggests using "monitoring" rather than "prediction" where desertification is concerned.

- At least two types of analysis that currently help assess desertification vulnerability are current vulnerability analyses produced by operational drought early warning systems and global desertification assessments.

- One key end product of desertification monitoring systems will be the spatial identification of populations at risk to promote timely appropriate action.

Measures for drought preparedness

Provision of information for preparedness is an integral part of an early warning system and should be designed to help each population at risk to effectively prepare for risks and hazards.

The information on measures for preparedness must take into account a range of coping strategies of the population at risk as well as their perception of risks and the costs to them, particularly in proportion to the expected benefits.

Public information and education about the risk of drought and desertification also improve the acceptance of the information concerning preparedness by strengthening people's capability to understand and interpret the information on risks.

Long-term adaptation involves the development of community based natural resources management plans, developed and implemented through a participatory approach, and making full use of traditional knowledge.

Recommendations

- Use the proposed UNCCD Overall Assessment of Desertification (OAD) as a baseline for monitoring at the global level.

- Establish National desertification information systems and include country profiles on desertification.

- Operational drought early warning systems should incorporate desertification monitoring into their activities and integrate systems to address both drought and desertification rather than establishing separate systems.

- Establish benchmarks and monitor indicators of desertification over time and strengthen institutional arrangements at all levels in accordance with the methodology developed by the ad hoc panel on benchmarks and indicators and contained in ICCD/COP(3)/CST/3/Add.1, and produce maps of vulnerability to desertification.

- Integrate early warning results with the results of other climate prediction systems such as the Climate Information and Prediction Services (CLIPS) and the Climate Variability Programme (CLIVAR).

- Encourage the further development and application of seasonal climate forecasting and long-range forecasting as tools for early warning systems.

- Establish institutional arrangements that improve coordination at the local, subnational, national, subregional, regional and global levels.

4. Dissemination of information to end-users on the applications of early warning systems and desertification monitoring and assessment, and strengthening of appropriate response mechanisms, particularly in the national action programmes to combat desertification

A. Dissemination of information

Methods and means

- The methods for information dissemination for drought and desertification may differ both between and within countries depending on the user and levels of development. Methods and means include the following:

  - Local satellite receivers located at village level to provide one way video and two way audio communication
  - Digital radio with printing capabilities
  - Internet
  - Workshops, farmers meetings and village meetings
  - Extension programmes
  - Knowledge centres
  - Traditional methods of information dissemination such as cultural events and religious meetings

- The type of information to be disseminated needs to be well defined. It is also important to ensure that the information be conveyed to communities rather than to individuals. The information also needs to be relayed with proposals for action to local communities.

- Vulnerability analysis provides an effective tool to disseminate information contained in early warning systems

  - Vulnerability analysis combines historical series of bio-physical and socio-economic data

  - For desertification carrying capacity analysis can indicate populations at risk

  - Vulnerability mapping assists in priority setting in natural resources management policies in time and space

  - Integration of vulnerability assessments at various spatial and temporal scales can assist in rational distribution of scarce resources.

Guiding principles

- The guiding principles for information dissemination include the following:

  - Use of local languages
  - Set priorities in information and response
  - Adapt scale of information to users
  - Monitor the impact of information
  - Let users define information needs and adapt time, place and means of communication to local use
  - Relate drought warning information to support options for the populations concerned

B. Strengthening of appropriate response mechanisms within NAPs

- NAPs need to identify key decision-making authorities at national and local level for issuing warning and coordinating response.

- The information must be streamlined and the information flow needs to be both vertical and horizontal. It is always important to target high-risk areas that are more prone to desertification. Telecommunication infrastructure also needs to be in place particularly in high-risk areas.

- Response to desertification and drought will be different. It is necessary to look at the response at the three levels listed below. It is important to stress that response mechanisms must be able to meet the needs of the local populations, so as to enable them to use the information effectively.

  - Response mechanisms to drought

    - Short-term response measures have embedded crisis management elements such as water and food and supply

    - Medium- and long-term gradual and broadening mechanisms cited below for desertification also serve as medium- and long-term mechanisms for the mitigation of the effects of drought

    - Utilize existing tools of other early warning systems and test them at local level

- Response mechanisms to desertification

  - short term response measure are mostly technical measures

  - gradual response mechanisms: change of behaviour, production patterns, agricultural systems and consumption patterns at local level

  - Broader measures: overall sustainable development strategies, change of agricultural policies,

  - Utilize tools existing in other early warning systems and test them at local level

- Response mechanisms to both drought and desertification

  - at local, subnational, national, subregional, regional and global levels

  - defining which response has to come from which level

  - non-governmental organizations, with assistance from the Government, have responsibility at the local level

  - Assess land capability criteria: soil, slope, microclimate etc.

Implementation of the response measures within NAP

- Include responses in the NAPs

- Establish multidisciplinary national expert networks for drought early warning systems and monitoring and assessment of desertification

- Promote structured international exchanges on drought early warning systems and the monitoring and assessment of desertification

Concluding recommendations

Concluding, the Panel makes the observation that further work is needed in order to elaborate on pending questions on early warning systems and monitoring and assessment of desertification. Whereas ISDR already is in charge of an ad hoc group for disaster reduction including drought as a natural disaster, there is not such a platform regarding the monitoring and assessment of desertification.

With regard to the pending questions:

- Critical analysis of the performance of early warning and monitoring, and assessment systems;

- Open questions on methods and approaches for the prediction of drought and monitoring desertification;

- Mechanisms to facilitate exchange between scientific and technical institutions

- More detailed measures for drought preparedness

The Panel recommends to the COP to reappoint the present Panel on drought early warning systems and monitoring and assessment of desertification to keep the actual members in order to assure continuity and to ask the Panel to elaborate in depth on the above-mentioned questions.

Annex I

PARTICIPANTS TO THE AD HOC PANEL MEETING ON EARLY WARNING SYSTEMS

MEMBERS OF THE AD HOC PANEL ON EARLY WARNING SYSTEMS

Mr. Patricio Aceituno	Chile
Mr. Abdellah Ghebalou	Algeria
Dr. Ali Umran Komuscu	Turkey
Mr. Zengyuan Li	China
Mr. Richard Muyungi	United Republic of Tanzania
Mr. Octavio Perez Pardo	Argentina
Dr. Valentin Sofroni	Republic of Moldova
Dr. Kazuhiko Takeuchi	Japan
Dr. Anneke Trux	Germany

Consultant

Dr. Ajai	Department of Space, Space Applications, ISSRO, India

Experts of relevant institutions

Mr. Alhassane Adama Diallo	Centre Regional AGRHYMET, Niger
Mr. Andrea de Vecchia	Centro Studi per l'applicazione dell'Informatica in Agricultura (CeSIA), Italy
Dr. Patrick Gonzalez	United States Agency for International Development (USAID), United States of America
Mr. Richard Masundire	Southern African Development Community (SADC), Zimbabwe
Mr. Haruo Miyata	Global Environmental Forum, Japan
Mr. Mauro Pedalino	Ministry of Foreign Affairs, Italy
Dr. M.V.K. Sivakumar	World Meteorological Organization (WMO), Switzerland
Mr. Papa Boubacar Soumare	Centre de Suivi Ecologique (CSE), Senegal

Annex II

DOCUMENTS SUBMITTED TO THE AD HOC PANEL ON EARLY WARNING SYSTEMS

Background documents

1. Decision 14/COP.3 (Early Warning Systems)

2. Document ICCD/COP(3)/CST/6 (Early Warning Systems: existing experiences of Early Warning Systems and specialized institutions operating in this field)

3. Document ICCD/COP(3)/CRP.1 (Early Warning Systems and Desertification: report of the workshop held in Niamey, Niger, from 25 to 28 October 1999)

4. Document ICCD/COP(3)/CRP.2 (Asia-Africa technical workshop on Early Warning Systems: report of the workshop held in Beijing, China, from 22 to 23 July 1999)

5. Early Warning Systems and Desertification. Paper presented to the workshop held in Niamey, Niger, from 25 to 28 October 1999. CeSIA, Florence, Italy.

6. Early Warning Systems in the context of Drought and Desertification. A background working paper for the UNCCD Ad Hoc Panel of Experts' Meeting to be held in May, 2000. Ajai, ISRO, Ahmedabad, India.

Conference room documents

1. Comments on the background paper to be discussed at the UNCCD ad hoc Panel Meeting on Early Warning Systems. Food and Agriculture Organization of the United Nations (FAO), Rome, Italy.

2. Desertification Status and Trends in China. Zengyuan Li, Institute of Forest Resources Information Technique, Chinese Academy of Forestry.

3. Early Warning Systems in the Context of the UNCCD. Haruo Miyata, Committee for Research on Combating Desertification and Land Degradation in Asia and Africa, Global Environmental Forum.

4. Overall Assessment of Desertification (OAD). Background document aiming to support discussions to be held at an expert consultation on the OAD, foreseen to be held end 1999, at the UNCCD secretariat headquarters. FAO, Rome, Italy.

5. Preliminary plan for monitoring the impacts of desertification and climate change. Famine Early Warning System Network (FEWS NET), United States Agency for International Development (USAID). Patrick Gonzalez, USAID, Washington, D.C., 29 May 2000.

6. Report on National and Local Capabilities for Early Warning. Andrew Maskrey, first author, Convener of International Working Group, Member of the IDNDR Scientific and Technical Committee, and General Coordinator of LA RED (Network for Social Studies on Disaster Prevention in Latin America). IDNDR Secretariat, Geneva, Switzerland, October 1997.

7. UNCCD ad hoc Panel on Early Warning Systems. Andrea Di Vecchia, CeSIA-Accademia dei Georgofili, Florence, Italy.

8. Views on early warning systems. Prof. Takashi Kosaki, Kyoto University and Prof. Masato Shinoda, Tokyo Metropolitan University. Excerpts from the Report on the study for promotion of the measures to combat

desertification, FY 1999. Edited and published by the Global Environmental Forum of Japan for the Environment Agency, Japan, March 2000.

Annex III

AGENDA OF THE AD HOC PANEL MEETING ON EARLY WARNING SYSTEMS

Wednesday, 31 May 2000

0930 - 1000	Registration
1000 - 1030	Welcoming statement by Representatives of the Arbeitnehmer-Zentrum Konigswinter (AZK), Dr. Eberhard Pies, Director and Ms. Mary Nisa Punnamparambil, Education & Training Officer
1030 - 1100	Remarks by the Representative of CCD Secretariat
1100 - 1130	Appointment of the Chairman of AHP/EWS, of topic Chairs and *Rapporteurs*
1130 - 1200	Statement by the Chairman of AHP/EWS

Topic 1: Data collection, accessibility and integration

1400 - 1430	Presentation of Topic 1
1430 - 1615	Discussion of Topic 1
1630 - 1730	Discussion of Topic 1

Thursday, 1 June 2000

0900 - 1045	Conclusion of Topic 1

Topic 2: Evaluation and prediction of drought and desertification, and measures for preparedness, in cooperation with the follow-up to the International Decade for Natural Disaster Reduction

1100 - 1130	Presentation of Topic 2
1130 - 1230	Discussion of Topic 2
1430 - 1615	Discussion of Topic 2
1630 - 1730	Conclusion of Topic 2

Friday, 2 June 2000

Topic 3: Dissemination of information to end users on the applications of early warning systems and desertification monitoring and assessment, and strengthening of appropriate response mechanisms, particularly in the National Action Programmes to combat desertification

0900 - 0930	Presentation of Topic 3
0930 - 1045	Discussion of Topic 3
1100 - 1230	Discussion of Topic 3

1430 - 1615	Conclusion of Topic 3
1630 - 1800	Discussion on the conclusions and recommendations of the AHP/EWS

Saturday, 3 June 2000

0930 - 1230	Drafting of report by the *Rapporteurs* of AHP/EWS
1430 - 1830	Adoption of the report
1830 - 1900	Closing Ceremony

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